1. A process for oxygen-tailoring polyethylene resin, the process comprising:
   (a) conveying polyethylene resin in a downstream direction through a feed zone, a melt-mixing zone downstream of the feed zone, and a melt zone downstream of the melt-mixing zone;
   (b) contacting the resin with oxygen in an amount of at least 40 parts by weight O_2 per million parts by weight resin (ppm (wt) O_2); and
   (c) contacting the resin with primary antioxidant,
   wherein step (c) is carried out downstream of step (b).

2. The process of claim 1, wherein the amount of O_2 is from 40 to 300 ppm (wt) O_2.

3. The process of claim 1, wherein the amount of O_2 is from 80 to 240 ppm (wt) O_2.

4. The process of claim 1, wherein contacting the resin with oxygen comprises providing O_2 in the feed zone.

5. The process of claim 1, wherein contacting the resin with oxygen comprises providing O_2 in the melt-mixing zone.

6. The process of claim 4 or 5, wherein contacting the resin with primary antioxidant comprises providing primary antioxidant in the melt zone.

7. The process of claim 4 or 5, wherein O_2 is provided in a gas mixture.

8. The process of claim 1, wherein the primary antioxidant comprises phenolic antioxidant, hindered amine antioxidant, or mixtures thereof.

9. The process of claim 1, further comprising contacting the resin with secondary antioxidant.

10. The process of claim 1, wherein the polyethylene resin has a density of at least 0.930 g/cm^3.

11. The process of claim 1, wherein the polyethylene resin has a density of at least 0.945 g/cm^3.

12. The process of claim 1, wherein the polyethylene resin has a bimodal molecular weight distribution.

13. The process of claim 1, wherein the polyethylene resin has a ratio M_w/M_n of at least 15.

14. A polyethylene resin formed by the process of claim 1.

15. A polyethylene film comprising polyethylene resin formed by the process of claim 1.

16. A process for extruding polyethylene resin, the process comprising:

(a) conveying polyethylene resin having an initial value of G"/G' ($\tan(\delta)_i$) in a downstream direction through a feed zone, a melt-mixing zone downstream of the feed zone, and a melt zone downstream of the melt-mixing zone;

(b) contacting the resin with oxygen in an amount of at least 40 parts by weight O_2 per million parts by weight resin (ppm (wt) O_2); and

(c) contacting the oxygen-contacted resin with primary antioxidant, to produce polyethylene resin having a final value of G"/G' ($\tan(\delta)_f$), wherein the change Δ in $\tan(\delta)$ defined by

$$\Delta \tan(\delta) = \frac{\tan(\delta)_i - \tan(\delta)_f}{\tan(\delta)_i}$$

is less than 15%.

17. The process of claim 16, wherein the final value of G"/G' ($\tan(\delta)_f$) is less than 14%.

18. The process of claim 16, wherein the final value of G"/G' ($\tan(\delta)_f$) is less than 13%.

19. The process of claim 16, wherein the final value of G"/G' ($\tan(\delta)_f$) is less than 12%.

20. The process of claim 16, wherein the final value of G"/G' ($\tan(\delta)_f$) is between about 12% and 10%.

21. The process of claim 16, wherein the amount of O_2 is from 40 to 300 ppm (wt) O_2.

22. The process of claim 16, wherein the amount of O_2 is from 80 to 240 ppm (wt) O_2.

23. The process of claim 16, wherein contacting the resin with oxygen comprises providing O_2 in the feed zone.

24. The process of claim 16, wherein contacting the resin with oxygen comprises providing O_2 in the melt-mixing zone.

25. The process of claim 23, wherein contacting the oxygen-contacted resin with primary antioxidant comprises providing primary antioxidant in the melt zone.

26. The process of claim 24, wherein contacting the oxygen-contacted resin with primary antioxidant comprises providing primary antioxidant in the melt zone.

27. The process of claim 23, wherein O_2 is provided in a gas mixture.

28. The process of claim 24, wherein O_2 is provided in a gas mixture

29. The process of claim 16, wherein $\Delta \tan(\delta)$ is from about 12% to about 1%.

30. The process of claim 16, wherein $\Delta \tan(\delta)$ is from about 12% to about 10%.

31. The process of claim 16, wherein the primary antioxidant comprises phenolic antioxidant, hindered amine antioxidant, or mixtures thereof.

32. The process of claim 16, further comprising contacting the resin with secondary antioxidant.

33. The process of claim 16, wherein $\tan(\delta)_i$ is from 0.5 to 3.0 measured at a frequency of 0.015 s^{-1}.

34. The process of claim 16, wherein the polyethylene resin has a density of at least 0.930 g/cm^3.

35. The process of claim 16, wherein the polyethylene resin has a density of at least 0.945 g/cm^3.

36. The process of claim 16, wherein the polyethylene resin has a bimodal molecular weight distribution.

37. The process of claim 16, wherein the polyethylene resin has a ratio M_w/M_n of at least 15.

38. A polyethylene resin formed by the process of claim 16.

39. A polyethylene film comprising polyethylene resin formed by the process of claim 16.

40. A process for oxygen-tailoring a high density polyethylene resin having a bimodal molecular weight distribution, the process comprising:

(a) conveying polyethylene resin having a density of at least 0.945 g/cm^3, a ratio M_w/M_n of at least 15, and an initial value of G"/G' ($\tan(\delta)_i$) in a downstream direction through a feed zone, a melt-mixing zone downstream of the feed zone, and a melt zone downstream of the melt-mixing zone;

(b) contacting the resin in the melt-mixing zone with oxygen in an amount of from 40 to 300 parts by weight O_2 per million parts by weight resin (ppm (wt) O_2); and

(c) contacting the oxygen-contacted resin in the melt zone with primary antioxidant comprising phenolic antioxidant, hindered amine antioxidant, or a mixture thereof,

to produce polyethylene resin having a final value of G"/G' ($\tan(\delta)_f$), wherein the change Δ in $\tan(\delta)$ defined by

$$\Delta \tan(\delta) = \frac{\tan(\delta)_i - \tan(\delta)_f}{\tan(\delta)_i}$$

is less than 15%.

41. The process of claim 40, wherein the final value of G"/G' ($\tan(\delta)_f$) is less than 14%.

42. The process of claim 40, wherein the final value of G"/G' ($\tan(\delta)_f$) is less than 13%.

43. The process of claim 40, wherein the final value of G"/G' ($\tan(\delta)_f$) is less than 12%.

44. The process of claim 40, wherein the final value of G"/G' ($\tan(\delta)_f$) is between about 12% and about 1%.

45. The process of claim 40, wherein the final value of G"/G' ($\tan(\delta)_f$) is between about 12% and 10%.

46. The process of claim 40, wherein the amount of O_2 is from 80 to 240 ppm (wt) O_2.

47. The process of claim 40, wherein O_2 is provided in a gas mixture.

48. The process of claim 40 further comprising contacting the resin with secondary antioxidant.

49. The process of claim 40, wherein $\tan(\delta)_i$ is from 0.5 to 3.0 measured at a frequency of 0.015 s^{-1}.

50. A polyethylene resin formed by the process of claim 40.

51. A polyethylene film comprising polyethylene resin formed by the process of claim 40.